Patent claims

1. A method for detecting the presence of a radar signal emitter, characterized in

- receiving said radar signals by a number of antennas, said antennas pointing in different directions and each antenna covering a sector of the surrounding area,
- splitting the signals received from the antennas into a number of first sub-bands,
- converting said first sub-bands into a baseband channel,
- summing all baseband channels forming a common baseband channel,
- digitalizing the signals in said baseband channel,
- processing the digitized signals in order to detect and identify the emitter source.

2. A method as claimed in claim 1, characterized in that said conversion step includes the following additional steps:

- converting each first sub-band into an intermediate frequency channel,
- summing all intermediate frequency channels, thus forming a common intermediate frequency channel,
- splitting said common intermediate frequency channel into a number of second sub-bands,
- converting said second sub-bands into said baseband channel.

3. A method as claimed in claim 2, characterized in

- performing broadband pulse detection on each first intermediate frequency channel prior to summing, in order to determine the direction and frequency of incoming signals.

4. A method as claimed in claim 1 or 2, c h a r a c t e r i z e d i n that the processing includes the following steps:

- transforming a received pulse signal series into the frequency domain,
- measuring pulse peak amplitude and average amplitude,
- measuring direction of arrival based on amplitude difference and phase difference in the baseband channels,
- measuring pulse width,
- measuring carrier frequency,
- measuring time of arrival,
- registering the received pulses in a carrier frequency/direction of arrival histogram.

5. A method as claimed in claim 4, c h a r a c t e r i z e d i n the additional steps of:

- identifying which pulses comes from the same emitter,
- performing emitter analysis,
- classifying emitters,
- performing emitter recognition by comparing registered emitter parameters and sampled pulse waveform to registrations in a emitter library.

6. A method as claimed in claim 5, c h a r a c t e r i z e d i n that said emitter analysis involves:

- improving direction of arrival measurements by averaging,
- performing echo-recognition by identifying "same" emitter i different directions,
- performing emitter antenna analysis, in order to identify rotation speed and beam width, based on pulse amplitudes.

7. A method as claimed in claim 6, c h a r a c t e r i z e d i n

- obtaining direction of arrival information from several neighbouring positions and
- finding the emitter position by triangulation.

8. An Electronic Support Measures unit for detecting and identifying radars present in an area,
c h a r a c t e r i z e d i n the unit including a number of antenna sets (10a, b - 16a, b), each antenna set including at least one antenna and each set covering a sector of the surrounding area,
a number of receiver front ends, each receiver front end being connected to an antenna set (10a, b - 16a, b) covering a specific sector, a number of first band-pass filters (20a - 20d) connected to a first antenna set (10a, b), said band-pass filters splitting the signals received from the first antenna set into a number of sub-bands,
a number of low noise preamplifiers (21a - 21d), each connected with its input to a first band-pass filter (20a - 20d) and the output connected to one of a corresponding number of mixers (22a - 22d), said mixers being adapted to convert a sub-band into baseband,
the output of the mixer being fed to a second band-pass filter, the outputs of all second band-pass filters being fed to an adder (32), said adder (32) being adapted to combine the signals received from the second band-pass filters into a common baseband frequency channel,
an Analog-to-Digital converter (35) connected to said adder (32) and being adapted to digitize the signals received from said adder (32),
a signal processing unit (9) receiving the signal from the Analog-to-Digital converter (35).

9. An Electronic Support Measures unit for detecting and identifying radars present in an area,
c h a r a c t e r i z e d i n the unit including a number of antenna sets (10a, b - 16a, b), each antenna set including at least one antenna and each set covering a sector of the surrounding area,

a number of receiver front ends, each receiver front end being connected to an antenna set (10a, b - 16a, b) covering a specific sector, a number of first band-pass filters (20a - 20d) connected to a first antenna set (10a, b), said band-pass filters splitting the signals received from the first antenna set into a number of first sub-bands,

a number of first low noise preamplifiers (21a - 21d), each connected with its input to a first band-pass filter (20a - 20d) and the output connected to one of a corresponding number of first mixers (22a - 22d), said mixers being adapted to convert a first sub-band into an Intermediate Frequency (1^{st} IF), the output from each first mixer being fed to a second band-pass filter (23a - 23d) tuned to the frequency of said Intermediate Frequency, an output of said second band-pass filters being connected to a first adder (25), said adder (25) being adapted to combine the signals from the second band-pass filters (23a - 23d) into a common Intermediate Frequency channel,

a number of receiver second stages, each connected to a receiver front end and receiving said common intermediate frequency channel, said intermediate frequency channel being fed to a number of third band-pass filters (27a - 27d) in order to split said common intermediate frequency channel into a number of second sub-bands, the output of each third band-pass filter (27a - 27d) being fed to a second amplifier (28a - 28d), the output of the second amplifier (28a - 28d) being fed to a second mixer (29a - 29d), said second mixer (29a - 29d) being adapted to convert said intermediate frequency channel into baseband, the output of the second mixer (29a - 29d) being fed to a fourth band-pass filter (30a - 30d), the outputs of all fourth band-pass filters (30a - 30d) being fed to a second adder (32), said second adder (32) being adapted to combine the signals received from the fourth band-pass filters (30a - 30d) into a common baseband channel,

an Analog-to-Digital converter (35) connected to said second adder (32) and being adapted to digitize the signals received from said second adder (32),
a signal processing unit (9) receiving the signal from the Analog-to-Digital converter (35).

10. A unit as claimed in claim 9,
c h a r a c t e r i z e d i n a number of first detectors, each with an input connected to the output of said second band-pass filters(23a - 23d), an output of each first detector being connected to an input of a comparator, a control logic connected to said first comparator, said logic being adapted to identify on which antenna a given signal is received.

11. A unit as claimed in claim 10,
c h a r a c t e r i z e d i n that each first low noise preamplifier and each second amplifier are equipped with an enable/disable input, said enable/disable input being connected to said control logic, said control logic being adapted to enable the operation of selected amplifiers and disable other amplifiers, in order to save power.

12. A unit as claimed in claim 9, 10 or 11,
c h a r a c t e r i z e d i n that the un it includes a total of 12 antennas, of which two antennas point in each direction, one of said two antennas covering the range of 2 - 6 GHz and the other covering the range of 6 - 18 GHz.

13. A system for determining the position and identity of radar signal emitters in an area,
c h a r a c t e r i z e d i n that the system includes a plurality of Electronic Support Measures units as claimed in any of the claims 8 - 12,
a network connecting the Electronic Support Measures units to a control centre (6), said control centre (6) including a database of known radar emitter signal signatures,

said control centre being arranged to receive direction and signature information of received radar signals from said Electronic Support Measures units, and being adapted to determine the position of a radar emitter by triangulation, and determine the identity of said radar emitter by comparison with emitter signatures stored in said database.